(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 918 897 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.09.2015 Bulletin 2015/38

(21) Application number: **15156745.0**

(22) Date of filing: **26.02.2015**

(51) Int Cl.:
F21S 8/08 *(2006.01)* ***F21V 29/71*** *(2015.01)*
F21V 29/80 *(2015.01)* ***F21V 29/83*** *(2015.01)*
F21Y 101/02 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **12.03.2014 CN 201410090659**

(71) Applicant: **OSRAM GmbH**
80807 München (DE)

(72) Inventors:
- **Zhang, Yunsong**
  518053 Shenzhen (CN)
- **Liang, Jiandong**
  518053 Shenzhen (CN)
- **Cheng, Yangang**
  518053 Shenzhen (CN)
- **Ku, Nimchung**
  518053 Shenzhen (CN)

(54) **Illumination module and illumination group comprising the illumination module**

(57) An illumination module (100), comprising a first heat dissipation means (1), a light engine (2) arranged on the first heat dissipation means (1), and a second heat dissipation means (3) connected to the first heat dissipation means (1),characterized in thatthe first heat dissipation means (1) comprises at least one first heat dissipation structure (31) configured as through hole, and the second heat dissipation means (3) comprises at least one second heat dissipation structure (32), wherein the second heat dissipation structure (32) comprises a heat dissipating hole (321) opened on the second heat dissipation means (3) and a protrusion (322) consisting of a part to be removed from the second heat dissipation means (3) for opening the heat dissipating hole (321).

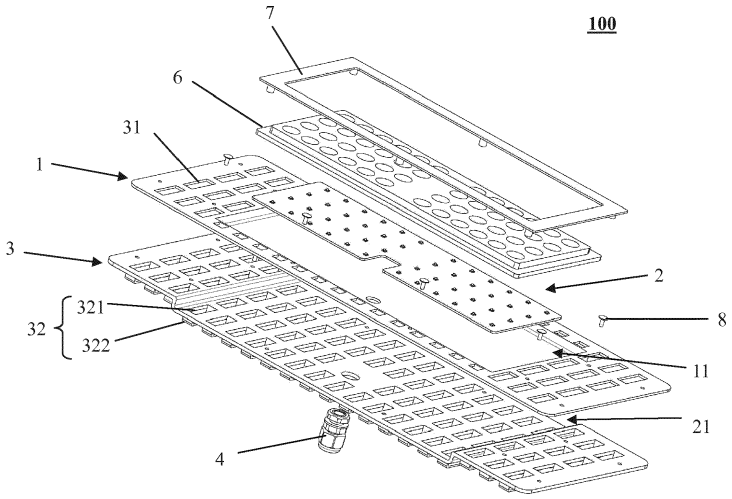

Figure 1

EP 2 918 897 A1

Description

Technical Field

[0001] The present invention relates to an illumination module and an illumination group comprising the illumination module.

Background Art

[0002] In order to meet the requirements of urban public lighting, the current illumination devices are designed with a high illumination power, usually higher than 650 W. Especially at crossroad, city plaza center, large market or large parking lot, the illumination device at a high place or on a high pole is needed for concentrated or high-lumen illumination in a large area. However, the high-power illumination devices at a high place or on a high pole often have a big weight, and then the illumination devices have lots of potential safety dangers due to the heavy body and installation at a high place. The illumination device provided in the existing technical solution usually uses an aluminium-made heat dissipation means made through an extrusion process or a die-casting process, and multiple such illumination device groups are again assembled into one illumination group. However, such illumination device or illumination group still has a heavy weight, and likewise will lead to potential safety dangers due to installation at a high place.

Summary of the Invention

[0003] In order to solve the above technical problem, it is provided in the technical solution of the present invention a novel illumination module and an illumination group comprising the illumination module. The illumination module according to the present invention is manufactured mainly through a stamping process, and effective heat dissipation airflow is formed by the heat dissipating holes opened on the heat dissipation means of the illumination module, so as to perform highly effective heat dissipation. In this way, not only the process of manufacturing the illumination module is simple, but also the weight of the heat dissipation means or the illumination module can be reduced to a great extent in a situation that highly effective heat dissipation of the illumination module is ensured.

[0004] One object of the present invention is realized via such an illumination module that comprises a first heat dissipation means, a light engine arranged on the first heat dissipation means, and a second heat dissipation means connected to the first heat dissipation means, characterized in that the first heat dissipation means comprises at least one first heat dissipation structure configured as a through hole, and the second heat dissipation means comprises at least one second heat dissipation structure, wherein the second heat dissipation structure comprises a heat dissipating hole opened on the second heat dissipation means and a protrusion consisting of a part to be removed from the second heat dissipation means for opening the heat dissipating hole. The illumination module according to the present invention can form a part of the first heat dissipation means or the second heat dissipation means by removing its own material or using the material to be removed, so as to reduce the weight of the heat dissipation means without increasing an additional element and thereby to reduce the weight of the illumination module. Besides, by cooperation of the through holes opened on the first heat dissipation means, the heat dissipating holes opened on the second heat dissipation means, and the protrusion, it is possible for the airflow to flow through the heat dissipation means, so as to increase a surface area of heat dissipation of the second heat dissipation means, enhance the air convection between the first heat dissipation means and the second heat dissipation means, and improve the entire heat dissipation performance of the illumination module.

[0005] According to one solution of the present invention, the heat dissipating hole is a blind hole, wherein the blind hole is opened in the protrusion, and an opening end of the blind hole is opened on the surface of the second heat dissipation means facing the light engine. In accordance with such a solution, the possibility that the airflow flows through the through hole and the blind hole is realized in cases where the opening end of the blind hole is capable of cooperating with the through hole of the first heat dissipation means, and the heat dissipation performance brought by the airflow is improved with the help of a surface area increased by the protrusion. Besides, the heat dissipating hole configured as blind hole also has certain dustproof effect, prevents accumulation of large amount of dirt in the first or second heat dissipation structure, and also facilitates possible subsequent cleaning.

[0006] According to a preferred solution of the present invention, the heat dissipating hole is a through hole, wherein the protrusion is configured as a fin extending from the surface of the second heat dissipation means away from the light engine. In cases where the heat dissipating hole is configured as a through hole, the heat dissipating hole still can cooperate with the through hole opened on the first heat dissipation means to provide a passage for heat dissipation using the airflow flowing though, and a different form of heat dissipation effect is realized using the increased surface area brought by the rib.

[0007] According to a solution of the present invention, preferably, the first heat dissipation structure and the heat dissipating hole of the second heat dissipation structure are configured to be positionally aligned such that the airflow flows through the first heat dissipation structure and the heat dissipating hole to dissipate heat of the illumination module. In cases where the first heat dissipation structure and the second heat dissipation structure are configured to be positionally aligned, the through hole of the first heat dissipation structure and the heat dissi-

pating hole of the second heat dissipation structure can form an airflow passage for more highly effective heat dissipation.

[0008] According to a solution of the present invention, preferably, the first heat dissipation means and the second heat dissipation means are made of metal material through stamping. With the stamping process, the first heat dissipation means and the second heat dissipation means can be simply and quickly made, and the material can be removed by opening the through hole without addition of an additional element, such that the weight of the illumination module is prominently reduced.

[0009] According to a solution of the present invention, alternatively, the first heat dissipation means and the second heat dissipation means are made of plastic material through injection molding. As an alternative solution, the injection molding process can provide a method of quickly and simply manufacturing the heat dissipation means, and preferably, a plastic material with highly effective heat dissipation performance can be used.

[0010] According to a preferred solution of the present invention, the first heat dissipation means comprises an accommodation cavity, wherein the accommodation cavity is configured to protrude away from the illuminating direction of the illumination module to receive the light engine.

[0011] Advantageously, the first heat dissipation structure is provided outside the area where the accommodation cavity is provided. Accordingly, the possibility of sealing the area occupied by the light engine on the first heat dissipation means, e.g. waterproof sealing or dustproof sealing, can be ensured.

[0012] Advantageously, the second heat dissipation means is formed with a recessed portion, and the first heat dissipation means is connected to the second heat dissipation means in such a manner that the accommodation cavity is embedded into the recessed portion. According to such a technical solution, the first heat dissipation means and the second heat dissipation means can be simply connected together in a form-fitted manner without increasing an additional volume of the illumination module.

[0013] According to a preferred solution of the present invention, the illumination module further comprises an electrical connecting element, through which the light engine is capable of forming electrical connection with the outside of the illumination module.

[0014] Advantageously, the electrical connecting element is configured such that the second heat dissipation means is secured on the first heat dissipation means in a screwing manner. With a single element, both the mechanical connection of the first heat dissipation means and the second heat dissipation means, and the electric connection of the light engine enclosed in the accommodation cavity and the outside of the illumination module can be realized.

[0015] The other object of the present invention is realized via such an illumination group that comprises at least one illumination module as described above, wherein the illumination group further comprises a holder, and wherein the holder comprises an assembling structure configured to combine and fix the at least one illumination module. Such an illumination group is easily and quickly assembled, and one or more illumination modules can be assembled into a large-scale illumination group with a bigger illumination range.

[0016] According to an implementation solution of the illumination group of the present invention, the assembling structure comprises a first aperture configured to be positionally aligned with the light engine such that light from the illumination module exits through the first aperture.

[0017] Advantageously, the assembling structure comprises a second aperture configured to be positionally aligned with the first heat dissipation structure for heat dissipation of the illumination module. The second aperture can form a heat dissipation passage through which the airflow flows together with the first heat dissipation structure on the first heat dissipation means and the second heat dissipation structure on the second heat dissipation means, so as to enhance the heat dissipation performance after the illumination module(s) is(are) assembled into an illumination group.

[0018] Advantageously, the holder further comprises a support configured to be connected to and support the assembling structure. The illumination group can be placed on the ground or on a high pole with the support.

Brief Description of the Drawings

[0019] The accompanying drawings constitute a part of the present

[0020] Description and are used to provide further understanding of the present invention. Such accompanying drawings illustrate the embodiments of the present invention and are used to describe the principles of the present invention together with the Description. In the accompanying drawings the same components are represented by the same reference numbers. As shown in the drawings:

Fig. 1 shows an exploded diagram of an illumination module according to an embodiment of the present invention;

Fig. 2A to Fig. 2B respectively show a schematic diagram of cross section in a length direction and a schematic diagram of cross section in a width direction of a first heat dissipation means according to an embodiment of the present invention;

Fig. 3A to Fig. 3B respectively show a schematic diagram of cross section in a length direction and a schematic diagram of cross section in a width direction of a second heat dissipation means according to an embodiment of the present invention; and

Fig. 4 shows a schematic diagram of an illumination group before assembling according to an embodiment of the present invention.

Detailed Description of the Embodiments

[0021] Fig. 1 shows an exploded diagram of an illumination module 100 according to an embodiment of the present invention. As shown in Fig. 1, the illumination module 100 according to the present invention may comprise a first heat dissipation means 1 and a second heat dissipation means 3 for dissipating heat of the illumination module 100, a light engine 2, and an electrical connecting element 4 capable of fixedly connecting the second heat dissipation means 3 to the first heat dissipation means 1, wherein the electrical connecting element 4 may be preferably configured as PG9 bolt, through which a wire for electric connection with the light engine 2 can directly run to the outside of the illumination module 100. Besides, the illumination module 100 may further comprise a lens 6 providing an optical function, a cover 7 for sealing the light engine 2 in a space formed by the first heat dissipation means 1 and the lens 6, and bolts 8 for, e.g., assisting mechanical connection of the first heat dissipation means 1 and the second heat dissipation means 3.

[0022] Fig. 1 further shows that the first heat dissipation means 1 may be preferably configured to have, but not limited to, a strip plate shape. In order to further enhance the heat dissipation performance of the first heat dissipation means 1, it also may be possible to increase a surface area of the first heat dissipation means 1 and configure the first heat dissipation means 1 in a square or other shape. For sealing the light engine 2 in the first heat dissipation means 1, a recessed accommodation cavity 11 is provided centrally in the first heat dissipation means, and the accommodation cavity 11 may be configured to recess to a direction away from the light engine 2 to form an accommodation cavity 11 for receiving the light engine 2 and/or the lens 6. After the light engine 2 and the lens 6 are placed in the accommodation cavity 11 of the first heat dissipation means 1, the lens 6 can be secured on the first heat dissipation means 1 using the cover 7 configured as a rectangular frame along edges of the lens 6. Consequently, the accommodation cavity 11 can form a space by the lens 6 and the cover 7 for sealing and isolating the light engine 2, and this space can be waterproof and dustproof to ensure durable and stable operation of the illumination module 100. In order to dissipate heat of the light engine 2 or the illumination module 100 using the first heat dissipation means 1, a first heat dissipating structure 31 configured as a through hole is formed on the first heat dissipation means 1. By means of the first heat dissipation means 1 which is made of a metal such as aluminium material for instance through a stamping process, and one or more through holes which are for example arranged in a predetermined manner and formed by removing the materials on a main body of the first heat dissipation means 1, airflow can directly pass through the through holes to dissipate heat of the first heat dissipation means 1 or the illumination module 100. It is foreseeable that the through holes formed on the first heat dissipation means 1 do not cover an area used by the accommodation cavity 11 in order to form a space sealing the light engine 2.

[0023] Besides, the second heat dissipation means 3 also may be configured in, but not limited to, a strip plate shape consistent with that of the first heat dissipation means 1. For realization of the heat dissipation function of the second heat dissipation means 3, the second heat dissipation means 3 is provided with a plurality second heat dissipation structures 32 each formed by a heat dissipating hole 321 and a protrusion 322. The heat dissipating hole 321 is configured as a blind hole having an opening end towards the through hole of the first heat dissipation means 1, wherein the heat dissipating hole 321 has an opening towards the light engine 2 for facilitating flow of airflow from the heat dissipating hole 321 to the through hole of the first heat dissipation means 1, or from the through hole to the heat dissipating hole 321. According to the solution of the present invention, the heat dissipating hole 321 of the second heat dissipation means 3 may be consistent in position with the first heat dissipation structure 31 designed as the through hole, that is, the second heat dissipation means 3 is provided with the heat dissipating hole 321 capable of being corresponding to or aligned with the position of each respective through hole on the first heat dissipation means 1. As a result, when the first heat dissipation means 1 and the second heat dissipation means 3 are assembled together, the through holes of the first heat dissipation means 1 can form passages of airflows for circulation and heat dissipation with the heat dissipating holes 321 of the second heat dissipation means 3. Furthermore, with the aid of the surface area increased by the protrusions 322, the airflow flowing through the heat dissipation passages can more effectively release the heat so as to enhance the heat dissipation performance of the first heat dissipation means 1 and the second heat dissipation means 3 or the illumination module 100.

[0024] Fig. 2A to Fig. 2B respectively show a schematic diagram of cross section in a length direction and a schematic diagram of cross section in a width direction of the first heat dissipation means 1 according to an embodiment of the present invention. When for instance the first heat dissipation means 1 is configured in a strip shape, viewed from the length direction of the first heat dissipation means 1, the accommodation cavity 11 has a profile protruding outwardly, in this way, the light engine 2 and the lens 6 can be placed in the accommodation cavity 11.

[0025] Fig. 3A to Fig. 3B respectively show a schematic diagram of cross section in a length direction and a schematic diagram of cross section in a width direction of the second heat dissipation means 3 according to an embodiment of the present invention. When the second heat dissipation means 3 is configured in a strip shape, viewed

from the length direction, the second heat dissipation means 3 has a profile protruding outwardly or recessing to formed a recessed portion 21, which profile may be configured consistent with the profile of the accommodation cavity 11 of the first heat dissipation means 1, thus, when the first heat dissipation means 1 is installed on the second heat dissipation means 3, the accommodation cavity 11 can be mounted into the recessed portion 21 in a form-fitted manner, such as embedding manner. Besides, the protrusions 322 provided on the second heat dissipation means 3 are formed when the second heat dissipation means 3 is processed for instance through stamping, and the protrusions 322 consist of the materials to be removed when the second heat dissipation means 3 is processed. The protrusions 322 may be preferably formed into a protruding shape as shown in Fig. 3A or Fig. 3B, and as shown in Fig. 3B which shows a cross section of the second heat dissipation means 3 in a width direction, the protrusions 322, after processed and molded, are formed with an opening towards a circumferential direction of the main body of the second heat dissipation means 3 (openings, for instance, perpendicular to the direction of the paper surface, as shown in Fig. 3B), for guiding the airflow to, e.g., a direction parallel to the main body of the second heat dissipation means 3.

[0026] In an example not shown of the second heat dissipation means 3 according to an example of the present invention, the protrusions 322 also may be alternatively configured as ribs or fins extending away from the light engine 2, for instance, the protrusions 322 may be configured in such a manner that the ribs or fins are made of the materials which need to be removed from the second heat dissipation means 3 in order to form the heat dissipating holes 321, when the second heat dissipation means 3 is processed by stamping. Thus, the protrusions 322 favorable for heat dissipation of the illumination module 100 are made in cases where the material and the weight of the second heat dissipation means 3 are reduced without increasing an additional weight of the second heat dissipation means 3.

[0027] Fig. 4 shows a schematic diagram of an illumination group 200 before assembling according to an embodiment of the present invention. The illumination group 200 comprises the illumination module 100 as described above and a holder 5 for assembling one or more illumination modules 100, wherein the holder 5 comprises an assembling structure 51 for combing one or more illumination modules 100 and a support 52 for supporting the assembled illumination group 200. The assembling structure 51 is provided with first aperture 511 positionally aligned with the first heat dissipation structures 31 of the first heat dissipation means 1 of the illumination module 100 for assisting heat dissipation of the assembled illumination group 200. Besides, the assembling structure 51 is further provided with a second aperture 512 positionally aligned with the light engine of the illumination module 100.

[0028] The above is merely preferred embodiments of the present invention but not to limit the present invention. For a person skilled in the art, the present invention may have various alterations and changes. Any alterations, equivalent substitutions, improvements, within the spirit and principle of the present invention, should be covered in the protection scope of the present invention.

List of reference signs

[0029]

1	first heat dissipation means
2	light engine
3	second heat dissipation means
4	electrical connecting element
5	holder
6	lens
7	cover
8	bolt
11	accommodation cavity
21	recessed portion
31	first heat dissipation structure
32	second heat dissipation structure
51	assembling structure
52	support
321	heat dissipating hole
322	protrusion
511	first aperture
512	second aperture
100	illumination module
200	illumination group

Claims

1. An illumination module (100), comprising a first heat dissipation means (1), a light engine (2) arranged on the first heat dissipation means (1), and a second heat dissipation means (3) connected to the first heat dissipation means (1), **characterized in that** the first heat dissipation means (1) comprises at least one first heat dissipation structure (31) configured as through hole, and the second heat dissipation means (3) comprises at least one second heat dissipation structure (32), wherein the second heat dissipation structure (32) comprises a heat dissipating hole (321) opened on the second heat dissipation means (3) and a protrusion (322) consisting of a part to be removed from the second heat dissipation means (3) for opening the heat dissipating hole (321).

2. The illumination module (100) according to claim 1, **characterized in that** the heat dissipating hole (321) is a blind hole, wherein the blind hole is opened in the protrusion (322), and an opening end of the blind hole is opened on the surface of the second heat dissipation means (3) facing the light engine (2).

3. The illumination module (100) according to claim 1, **characterized in that** the heat dissipating hole (321) is a through hole, wherein the protrusion (322) is configured as a fin extending from the surface of the second heat dissipation means (3) away from the light engine (2).

4. The illumination module (100) according to any one of claims 1-3, **characterized in that** the first heat dissipation structure (31) and the heat dissipating hole (321) of the second heat dissipation structure (32) are configured to be positionally aligned such that the airflow flows through the first heat dissipation structure (31) and the heat dissipating hole (321) for the heat dissipation of the illumination module (100).

5. The illumination module (100) according to any one of claims 1-3, **characterized in that** the first heat dissipation means (1) and the second heat dissipation means (2) are made of metal material through stamping.

6. The illumination module (100) according to any one of claims 1-3, **characterized in that** the first heat dissipation means (1) and the second heat dissipation means (2) are made of plastic material through injection molding.

7. The illumination module (100) according to any one of claims 1-3, **characterized in that** the first heat dissipation means (1) comprises an accommodation cavity, wherein the accommodation cavity is configured to protrude away from the illuminating direction of the illumination module (100) to receive the light engine (2).

8. The illumination module (100) according to claim 7, **characterized in that** the first heat dissipation structure (31) is provided outside the area where the accommodation cavity is provided.

9. The illumination module (100) according to claim 7, **characterized in that** the second heat dissipation means (2) is formed with a recessed portion, and the first heat dissipation means (1) is connected to the second heat dissipation means (2) in such a manner that the accommodation cavity is embedded into the recessed portion.

10. The illumination module (100) according to any one of claims 1-3, **characterized in that** the illumination module (100) further comprises an electrical connecting element (4), through which the light engine (2) is capable of forming electrical connection with the outside of the illumination module (100).

11. The illumination module (100) according to claim 10, **characterized in that** the electrical connecting element (4) is configured such that the second heat dissipation means (3) is secured on the first heat dissipation means (1) in a screwing manner.

12. An illumination group, **characterized in that** the illumination group comprises at least one illumination module (100) according to any one of claims 1-11, the illumination group further comprises a holder (5), wherein the holder (5) comprises an assembling structure (51) configured to combine and fix the at least one illumination module (100).

13. The illumination group according to claim 12, **characterized in that** the assembling structure (51) comprises a first aperture (511) configured to be positionally aligned with the light engine (2) such that light from the illumination module (100) exits through the first aperture (511).

14. The illumination group according to claim 12 or 13, **characterized in that** the assembling structure (51) comprises a second aperture (512) configured to be positionally aligned with the first heat dissipation structure (31) for heat dissipation of the illumination module (100).

15. The illumination group according to claim 12, **characterized in that** the holder (5) further comprises a support (52) configured to be connected to and support the assembling structure (51).

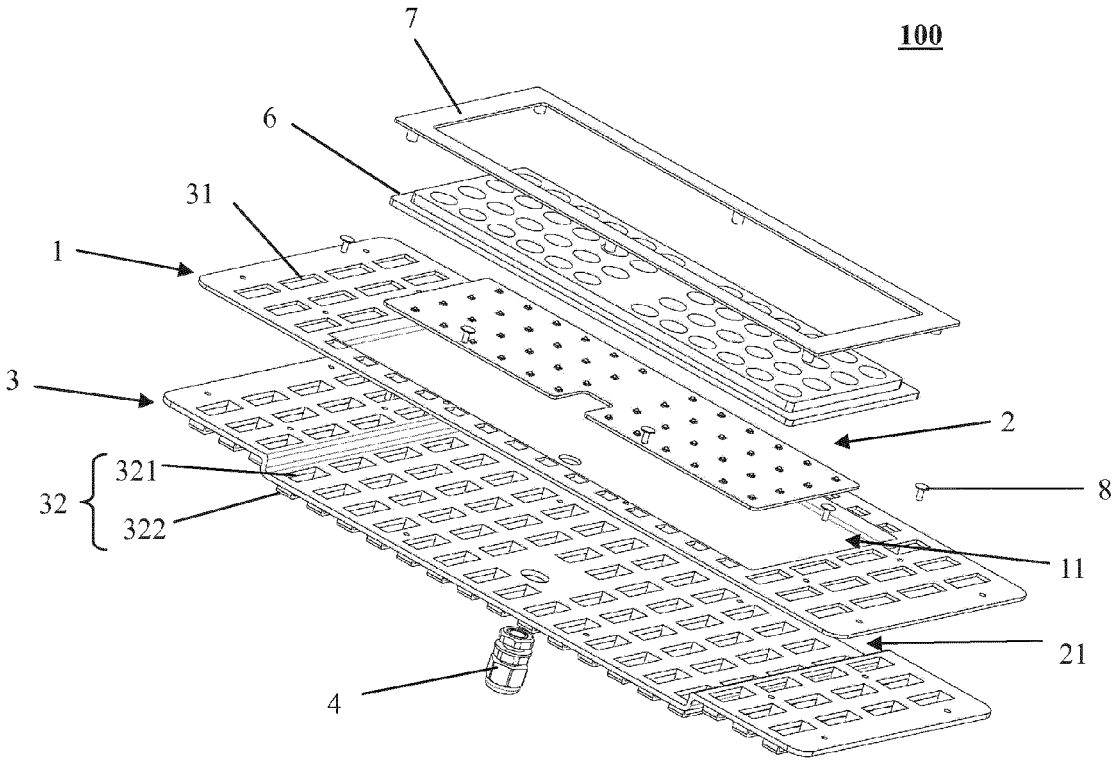

Figure 1

Figure 2A

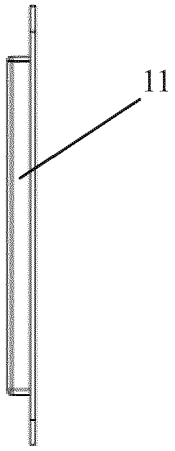

Figure 2B

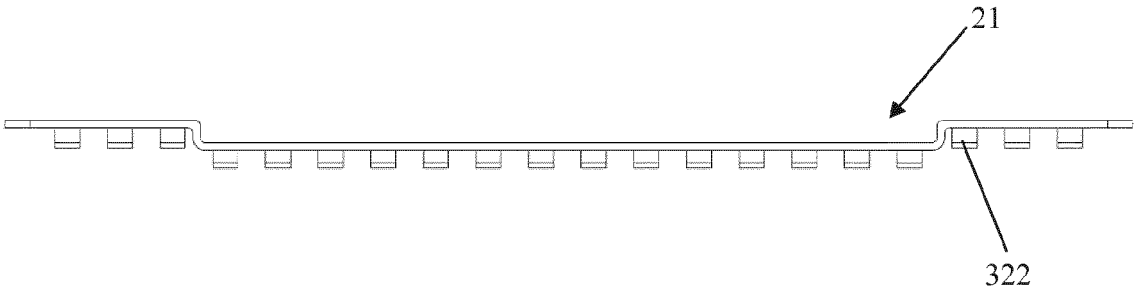

Figure 3A

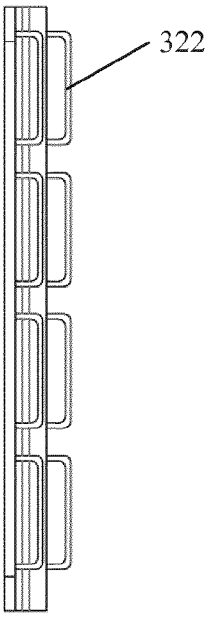

Figure 3B

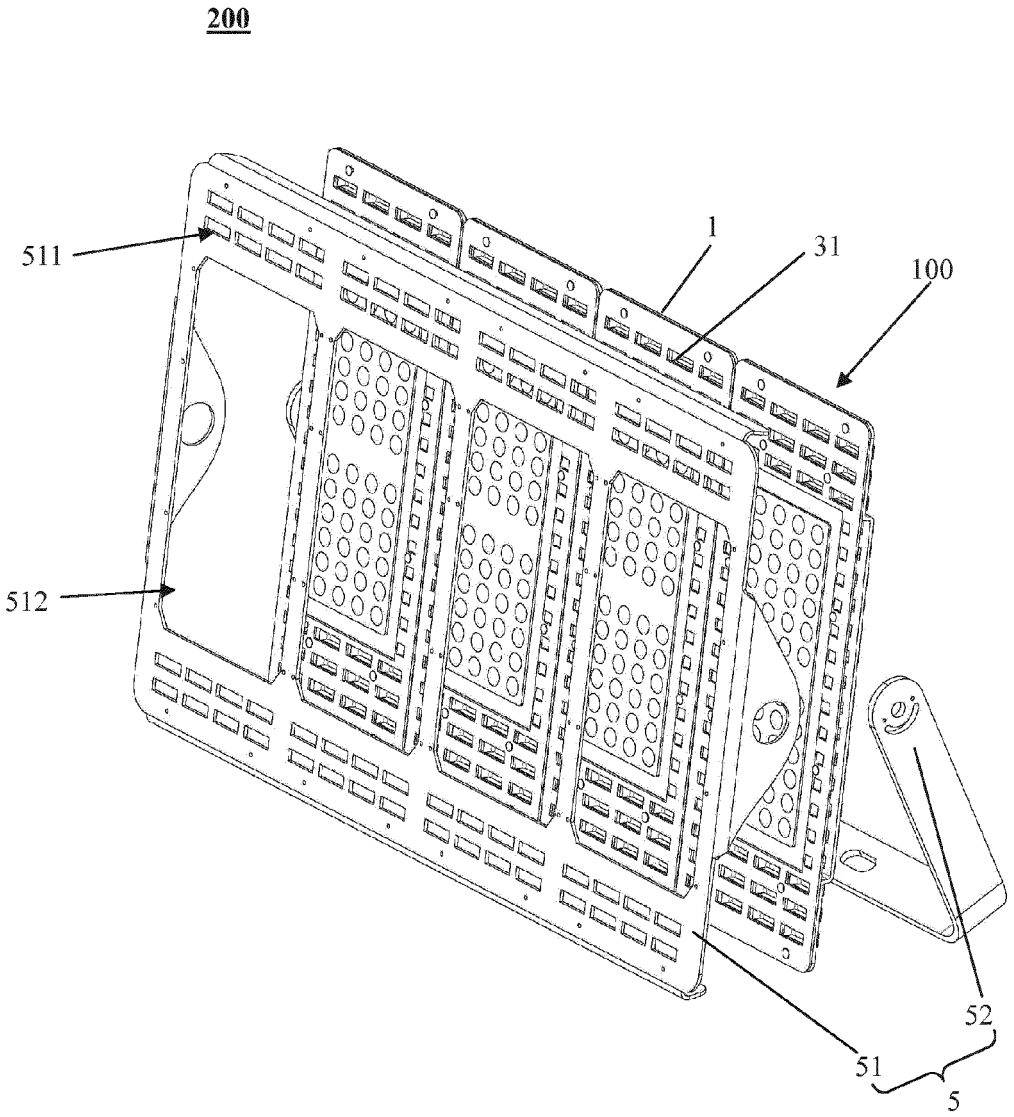

Figure 4

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 15 15 6745

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2011/063832 A1 (HU SHENG-HSIUNG [TW] ET AL) 17 March 2011 (2011-03-17) * paragraph [0025] - paragraph [0041] * * figures 1-4,7,8 *	1,4,5,7, 8,10,12	INV. F21S8/08 F21V29/71 F21V29/80 F21V29/83
X	DE 10 2007 022425 A1 (IND TECH RES INST [TW]) 18 September 2008 (2008-09-18) * paragraph [0009] - paragraph [0013] * * figures 1-3 *	1,10,12, 15	ADD. F21Y101/02
X	WO 2011/075116 A1 (GRAFTECH INT HOLDINGS INC [US]; PETROSKI JAMES T [US]; REIS BRADLEY E) 23 June 2011 (2011-06-23) * paragraph [0036] - paragraph [0039] * * figures 1-4 *	1,3-8, 10-12,15	
X	WO 2010/130212 A1 (ZHEJIANG XIZI OPTOELECTRONIC T [CN]; CHEN KAI [CN]; ZHANG ZIQI [CN]; F) 18 November 2010 (2010-11-18) * page 4, line 9 - page 6, line 27 * * figures 2-9 *	1,3-5,7, 9-12,14, 15	
X	KR 101 332 334 B1 (APACK INC [KR]) 22 November 2013 (2013-11-22) * paragraph [0001] - paragraph [0059] * * figures 1-6 *	1,3-5, 7-12,15	TECHNICAL FIELDS SEARCHED (IPC) F21S F21W F21Y F21V
A	US 2013/088869 A1 (YUN KYUNG MIN [KR] ET AL) 11 April 2013 (2013-04-11) * figures 10-12 *	1	
A	US 2011/255285 A1 (LAI CHENG-TIEN [TW] ET AL) 20 October 2011 (2011-10-20) * paragraph [0014] - paragraph [0023] * * figure 6 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 July 2015	Blokland, Russell

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 15 6745

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-07-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011063832 A1	17-03-2011	NONE	
DE 102007022425 A1	18-09-2008	DE 102007022425 A1	18-09-2008
		TW 200837309 A	16-09-2008
		US 2008225533 A1	18-09-2008
WO 2011075116 A1	23-06-2011	CN 203223884 U	02-10-2013
		DE 212009000243 U1	06-08-2012
		US 2013242573 A1	19-09-2013
		WO 2011075116 A1	23-06-2011
WO 2010130212 A1	18-11-2010	NONE	
KR 101332334 B1	22-11-2013	KR 101332334 B1	22-11-2013
		US 2014218942 A1	07-08-2014
US 2013088869 A1	11-04-2013	CN 103874882 A	18-06-2014
		EP 2767757 A1	20-08-2014
		JP 5189218 B1	24-04-2013
		JP 5384716 B2	08-01-2014
		JP 5567729 B2	06-08-2014
		JP 5572204 B2	13-08-2014
		JP 5572205 B2	13-08-2014
		JP 2013084560 A	09-05-2013
		JP 2013084610 A	09-05-2013
		JP 2013084611 A	09-05-2013
		JP 2013084612 A	09-05-2013
		JP 2013258163 A	26-12-2013
		US 2013088869 A1	11-04-2013
		US 2015085487 A1	26-03-2015
		WO 2013054996 A1	18-04-2013
US 2011255285 A1	20-10-2011	CN 102221134 A	19-10-2011
		JP 2011228286 A	10-11-2011
		US 2011255285 A1	20-10-2011

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82